

cancerous cells at a faster, more uniform rate, while simultaneously preserving all of the advantages of using a soft X-ray emitting radioisotope. Such cancers are those found in the brain, lung, pancreas, prostate and other tissues.

[0006] The low energy X-ray seeds of I-125 and Pd-103 have been used successfully in the treatment of cancer. Methods for encapsulation of these radioactive isotopes as seeds or capsules for interstitial brachytherapy are described in U.S. Patent Nos. 1,753,287; 3,351,049; 4,323,055; 4,702,228; 4,784,116; 4,891,165; 4,994,013; 5,163,896; 5,405,309 and 6,099,458, and are incorporated herein by reference.

[0007] Some of the above-referenced seeds suffer from a number of disadvantages and limitations. They include: (a) the lower energy of the X-ray from Pd-103 (20 keV); (b) the half-life of the I-125 seed (60-days) is typically too long to permit its use as a permanent implant in anything other than slow growing tumors; (c) the use of a silver wire marker incorporated into I-125 seeds (U.S. Patent No. 4,323,005) has a large unwanted amount of characteristic low energy (<10 keV) silver K-X-rays; and (d) seeds with various internal components with non-optimized geometrics, which require a greater amount of isotope to compensate for the non-uniform dose pattern surrounding the seed.